

## CLAIMS

The invention claimed is:

1. Apparatus for converting the output of a photodiode to a log function, comprising:

a photodiode having output providing a current proportional to incident optical energy; and,

a junction diode coupled between said output and ground, whereby the current representing the incident energy is converted to a log voltage, with the termination of said output with said junction diode providing said log voltage.

2. The apparatus of claims 1, and further including an additional junction diode connected between the output of said first mentioned junction diode and ground, whereby the output voltage obtainable at said output is multiplied by the number of diodes connected between said output and ground.

3. The apparatus of claim 1, wherein said photodiode is a PIN diode.

4. A method for providing high dynamic range and increased bandwidth to a photodetector circuit in which a photodetector provides as an output a current proportional to the power of radiation incident thereon, comprising the act of:

providing the output of the photodetector with a diode termination to ground, and whereby the output of the photodetector is a log voltage proportional to the power of the incident radiation.

5. The method of claim 4 further including the acts of:

projecting an ultrashort laser pulse towards a sea surface;

detecting returns reflected by subsea objects at a position above the sea surface; and,

wherein said output current from said photodetector is converted to a log voltage to permit detection of said subsea objects.

6. The method of claim 5, wherein said photodetector includes a PIN number.

7. The method of claim 5, and further including an additional junction diode connected in series with the first mentioned diode to ground for increasing the voltage at the output of the photodiode.